

iWay

iWay Emulation Adapter
(3270/5250) User's Guide
Version 7.0.x and Higher

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Preface

This documentation describes how to install, configure, and use the iWay Emulation Adapter (3270/5250). It is intended for system administrators who are responsible for planning an enterprise software environment.

Note: This Release 7.0.x content is currently being updated to support iWay Release 8.0.x software. In the meantime, it can serve as a reference for your use of iWay Release 8. If you have any questions, please contact Customer_Success@ibi.com.

How This Manual Is Organized

This manual includes the following chapters:

	Chapter/Appendix	Contents
1	Introducing the iWay Emulation Adapter (3270/5250)	Provides an overview of the iWay Emulation Adapter (3270/5250) and describes how to install it.
2	Understanding Telnet Designer	Describes the Telnet Designer user interface. This includes a description of available menus and options.
3	Using Remote Procedure Call Mode	Describes how to use the iWay Emulation Adapter (3270/5250) to create a Remote Procedure Call (RPC) of an emulation session and save it as a stand-alone Java program.
4	Creating XML Schemas and iWay Business Services	Describes how to create XML schemas and iWay Business Services that will be used to execute the iWay Emulation Adapter (3270/5250).
5	Using Emulation and Recorder Modes	Describes how to use Emulation mode, which allows you to access a mainframe session directly from your workstation, and how to use Recorder Mode, which allows you to record an emulation session so that you can play back at a later time to simulate a live mainframe session.
A	Emulator Keyboard Mapping	Describes how your keyboard maps to 3270/5250 keys when you use the emulator.

Documentation Conventions

The following table describes the documentation conventions that are used in this manual.

Convention	Description
THIS TYPEFACE or this typeface	Denotes syntax that you must enter exactly as shown.
<i>this typeface</i>	Represents a placeholder (or variable), a cross-reference, or an important term. It may also indicate a button, menu item, or dialog box option that you can click or select.
<u>underscore</u>	Indicates a default setting.
Key + Key	Indicates keys that you must press simultaneously.
{ }	Indicates two or three choices. Type one of them, not the braces.
	Separates mutually exclusive choices in syntax. Type one of them, not the symbol.
...	Indicates that you can enter a parameter multiple times. Type only the parameter, not the ellipsis (...).
. . .	Indicates that there are (or could be) intervening or additional commands.

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Help Us to Serve You Better

To help our consultants answer your questions effectively, be prepared to provide specifications and sample files and to answer questions about errors and problems.

The following tables list the environment information our consultants require.

Platform	
Operating System	
OS Version	
JVM Vendor	
JVM Version	

The following table lists the deployment information our consultants require.

Adapter Deployment	For example, iWay Business Services Provider, iWay Service Manager
Container	For example, WebSphere

Version	
Enterprise Information System (EIS) - if any	
EIS Release Level	
EIS Service Pack	
EIS Platform	

The following table lists iWay-related information needed by our consultants.

iWay Adapter	
iWay Release Level	
iWay Patch	

The following table lists additional questions to help us serve you better.

Request/Question	Error/Problem Details or Information
Did the problem arise through a service or event?	
Provide usage scenarios or summarize the application that produces the problem.	
When did the problem start?	
Can you reproduce this problem consistently?	
Describe the problem.	
Describe the steps to reproduce the problem.	
Specify the error message(s).	

Request/Question	Error/Problem Details or Information
Any change in the application environment: software configuration, EIS/database configuration, application, and so forth?	
Under what circumstance does the problem <i>not</i> occur?	

The following is a list of error and problem files that might be applicable.

- Input documents (XML instance, XML schema, non-XML documents)
- Transformation files
- Error screen shots
- Error output files
- Trace files
- Service Manager package to reproduce problem
- Custom functions and agents in use
- Diagnostic Zip
- Transaction log

For information on tracing, see the *iWay Service Manager User's Guide*.

User Feedback

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Thank you, in advance, for your comments.

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Introducing the iWay Emulation Adapter (3270/5250)

The iWay Emulation Adapter (3270/5250) captures mainframe 3270 or 5250 screens and their output to create a Java™ program, an XML file for a Remote Procedure Request (RPC) solution, or components for a web-based solution. This web-based solution can be used to replace green-screen displays with sophisticated user interfaces.

Using the adapter also enables you to invoke mainframe applications from non-mainframe environments, such as UNIX and Windows, without modifying the mainframe. You can have logic and data associated with legacy mainframe programs available to a new generation of applications.

In this chapter:

- [Integrating Mainframe Logic](#)
 - [Remote Procedure Call Development Mode](#)
 - [Installing the iWay Emulation Adapter \(3270/5250\)](#)
 - [Deployment Information for the iWay Emulation Adapter \(3270/5250\)](#)
-

Integrating Mainframe Logic

Telnet is a standard protocol for remote logon over the Internet. The name is an abbreviation of Telecommunications Network. When a user establishes a Telnet connection to a remote mainframe computer, the user's local system emulates a terminal connected directly to the mainframe.

The iWay Emulation Adapter (3270/5250) allows you to view your online application as an object that can be run from any front-end or application server. The choice of the deployment method depends on your business need and the desired result.

Depending on how you want to run your online application, the adapter can transform your 3270 or 5250 screens into HTML pages, wrap the application screens inside a Java program, or create an iWay RPC (remote procedure request) to transform the output of any number of screens into an answer set.

The Telnet Adapter redefines the way a 3270 or 5250 online applications are perceived. You can use the Telnet Adapter to create re-usable business objects. Captured within these business objects are the actual screens and business logic behind them that have been running within your enterprise. These business objects can be deployed from high-tech applications and servers to be used as part of any integration effort.

iWay Emulation Adapter (3270/5250) Components

The Telnet Adapter includes the following components:

- ❑ **Telnet Designer.** A GUI tool you can use to emulate the screens, the process flow, and key strokes in a mainframe session. For more information, see [Understanding Telnet Designer](#) on page 19.
- ❑ **Telnet API.** A Java-based programming API used to programmatically control the execution and manipulation of screen-based programs.

Remote Procedure Call Development Mode

In a production environment, your application can communicate with a mainframe session using files. The application sends keystrokes to the mainframe in an XML request document, and the mainframe returns screen data in an XML response document. You can use these documents to integrate a mainframe session into your application. This is called RPC (Remote Procedure Call) mode.

Using RPC mode enables you to create a standalone Java program that contains the methods for each screen and a subset of Telnet API commands embedded within it that allow you to compile the program and run the application from any Java enabled environment. The Telnet Designer automatically generates the Java code for you. In this way, you do not have to manually enter the code for your programs. Manual customization to the generated Java program is required to enable greater functionality.

For more information on using RPC mode, see [Using Remote Procedure Call Mode](#) on page 33.

Emulating and Recording Mainframe Sessions

Whether you are developing your application using RPC mode, the development process allows you to emulate and record a mainframe session.

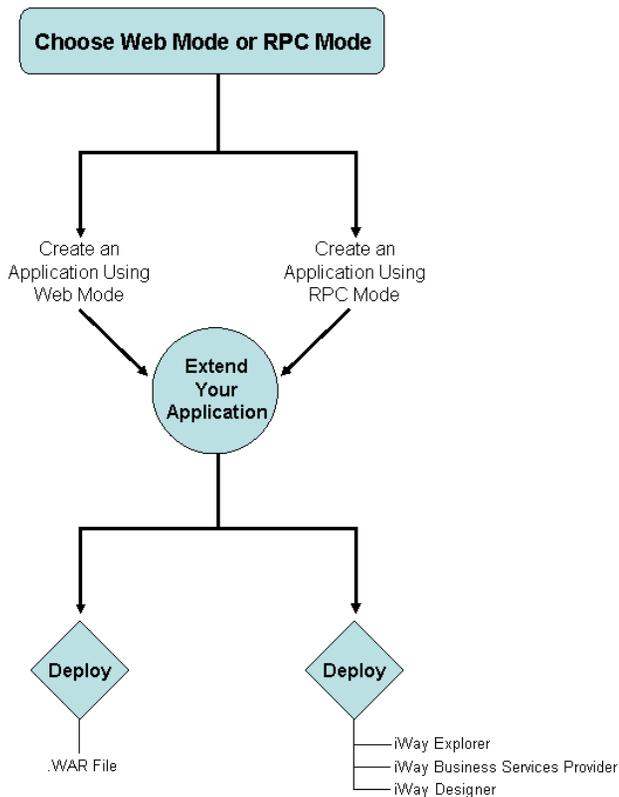
You can emulate a mainframe session directly from your workstation using the Telnet Designer, which displays standard 3270/5250 screens.

You can record your interaction with a mainframe session and later play it back to simulate a live mainframe session. Simulating a session enables you to develop an application offline. This is useful in situations when the mainframe is unavailable.

For more information on emulating and recording your mainframe session, see [Using Emulation and Recorder Modes](#) on page 59.

Development Roadmap

The following image illustrates an overview of the development process when using the iWay Emulation Adapter (3270/5250).



Installing the iWay Emulation Adapter (3270/5250)

The iWay Emulation Adapter (3270/5250) links new business applications to mainframe-based business logic through IBM 3270/5250 terminal screens and data streams. It enables you to transform your 3270/5250 mainframe screens into HTML pages or to create a Remote Procedure Call (RPC) request to transform the output of screens into an answer set. The adapter provides a simple, lightweight, and scalable way to reuse the business logic and data of terminal applications.

The iWay Emulation Adapter (3270/5250) requires client components that you must configure after installing iWay 7.0.2 SM. The two client components are:

- The run-time component, which is supported on:
 - Microsoft Windows 2000 with SP2 and Windows 2003.
 - UNIX.
 - OS/390 and z/OS (under UNIX System Services (USS)).
- The Telnet Designer, which is supported on:
 - Microsoft Windows 2000 with SP2.
 - Windows 2003.
 - Windows XP SP1.

Note: If you plan to run the Emulation Adapter on a UNIX system, you must install iWay 7.0.2 SM and the Emulation Adapter client components on the UNIX system and also install the adapter client components on a Windows system. This enables you to use the Telnet Designer, which is supported on Windows only.

The iWay Emulation Adapter requires client components, including the Telnet Designer, that must be configured after installing iWay 7.0.2 SM.

Procedure: How to Install the iWay Emulation Adapter Client Components

To install the iWay Emulation Adapter client components:

1. Unzip the *iwtelnettool.zip* archive file to a location on your file system.

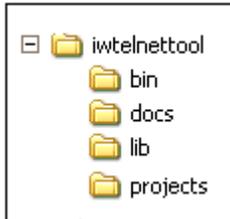
The *iwtelnettool.zip* archive file is located in the following directory:

`<iway_home>\etc\setup\emulation`

Note: If you are using the iWay Emulation Adapter with iWay Service Manager (iSM), it is recommended that you install the iWay Emulation Adapter client components under the iSM root directory. For example:

```
<iway_home>\etc\setup\emulation\iwtelnettool\
```

When you unzip the *iwtelnettool.zip* archive file, the following directory structure is created:



Note: A logs subfolder is created in this directory structure when logs are initially generated.

2. Ensure that the *iwtelnet.jar* file is available in the following iSM lib directory:

```
C:\Program Files\iWay7\lib
```

If the *iwtelnet.jar* file is not available in this location, you can copy it from the following directory:

```
<iway_home>\etc\setup\emulation\iwtelnettool\lib
```

Deployment Information for the iWay Emulation Adapter (3270/5250)

The iWay Emulation Adapter (3270/5250) can be used in conjunction with one of the following components.

- iWay Service Manager
- iWay Explorer
- iWay Business Services Provider (iBSP)

When hosted in an iWay environment, the adapter is configured through iWay Service Manager and iWay Explorer. iWay Explorer is used to configure adapter connections, create web services, and configure event capabilities.

When the adapter is hosted in a third party application server environment, iWay Explorer can be configured to work in a web services environment in conjunction with the iBSP.

Deployment Information Roadmap

The following table lists the location of deployment and user information for components of the iWay Emulation Adapter (3270/5250).

Deployed Component	For more information, see
iWay Service Manager	<i>iWay Service Manager User's Guide</i>
iWay Explorer	<i>iWay Installation and Configuration</i>
iWay Business Services Provider (iBSP)	<i>iWay Installation and Configuration</i>

iWay Service Manager

iWay Service Manager is the heart of the Universal Adapter Framework and is an open transport service bus. Service Manager uses graphical tools to create sophisticated integration services without writing custom integration code by:

- Creating metadata from target applications.
- Transforming and mapping interfaces.
- Managing stateless processes.

Its capability to manage complex adapter interactions makes it ideally suited to be the foundation of a service-oriented architecture.

iWay Explorer

iWay Explorer uses an explorer metaphor to create XML schemas and web services for the associated object. In addition, you can create ports and channels to listen for events.

iWay Business Services Provider

The iWay Business Services Provider (iBSP) exposes (as web services) enterprise assets that are accessible from adapters regardless of the programming language or the particular operating system.

iBSP simplifies the creation and execution of web services when running:

- Custom and legacy applications.
- Database queries and stored procedures.
- Packaged applications.
- Terminal emulation and screen-based systems.

❑ Transactional systems.

Web services is a distributed programming architecture that solves Enterprise Application Integration (EAI) hurdles that other programming models cannot. It enables programs to communicate with one another using a text-based, platform- and language-independent message format called XML.

Coupled with a platform and language independent messaging protocol called SOAP (Simple Object Access Protocol), XML enables application development and integration by assembling previously built components from multiple web services.

Understanding Telnet Designer

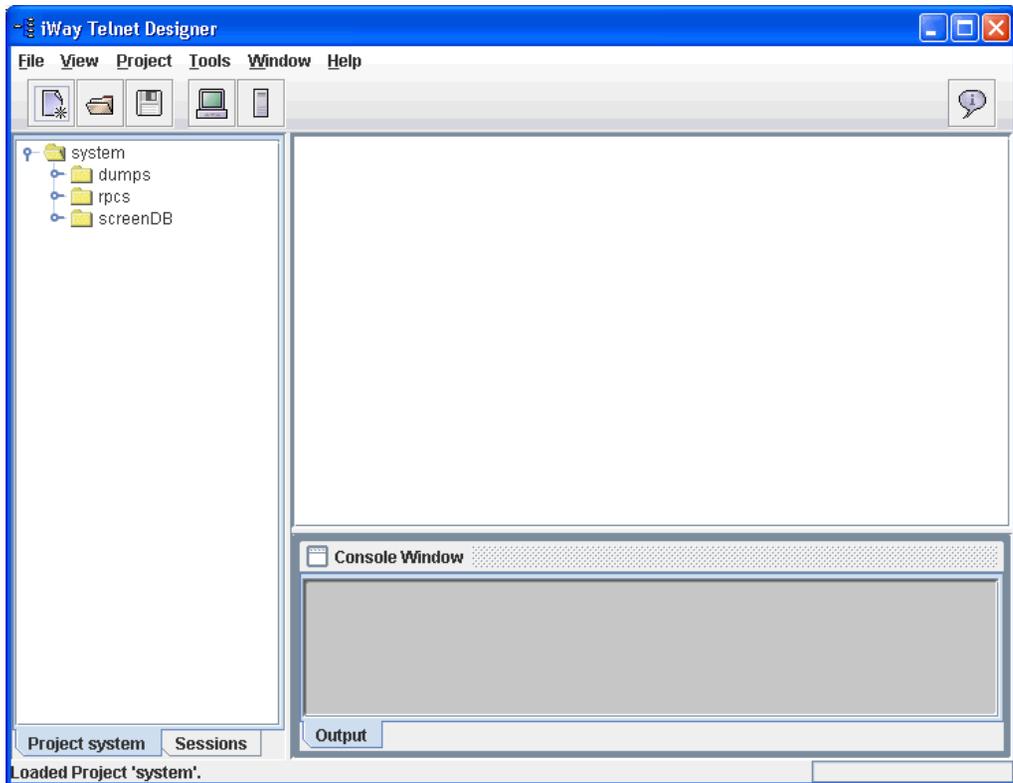
This section describes the menus and options available in the Telnet Designer.

In this chapter:

- [Navigating Telnet Designer](#)
 - [Telnet Designer Menu Options](#)
 - [Working With Telnet Designer Projects](#)
 - [Telnet Designer Tools](#)
-

Navigating Telnet Designer

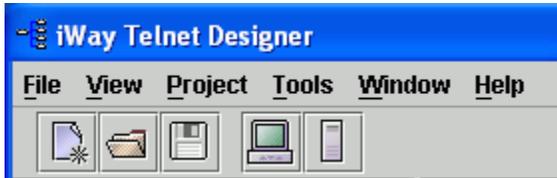
The Telnet Designer window contains three panes:



- The left pane is the navigation pane. It provides access to your Telnet adapter project folders and Telnet session data. Two tabs at the bottom of the pane access project folders (Project name) and your Telnet sessions (Sessions). A default project named system is provided with Telnet Designer. The Project tab displays the current project name.
- The right pane displays the current session design activity.
- The Console Window appears at the bottom of the window and displays Telnet Designer status and messages.

Telnet Designer Menu Options

The Telnet Designer main menu appears at the top of the window and beneath that, a series of icons that represent the most frequently used options. The following image shows the main menu and the option icons.



The following table lists and describes the options available from the main menu.

Menu	Menu Options	Description
File	Exit	Close Telnet Designer.
View	Output Window	Activate the Output tab of the Console Window.
	Viewer Window	Open a Viewer window in the right pane. The pane provides a tab for each loaded viewer data. Not currently used.
	Screen DB Viewer	Open a Screen DB Viewer in the right pane. This pane displays the currently loaded screenDB. The pane provides a tab for each loaded screenDB.
Project	New Project	Create a new project.
	Open Project	Open an existing project.
Tools	Emulator	Open the Terminal Emulator tool.
	Player Server	Open the Player Server tool.
	Options	Open the Options dialog box in which you set options for the Emulator and Player Server.

Menu	Menu Options	Description
Window	Cascade	Display the windows that appear in the right pane in a cascading format.
	Tile	Display the windows that appear in the right pane in a tile format.
	This menu also provides a list of all windows that are open in the right pane. You can select a window from this list to activate it in the right pane.	
Help	About	Open the About window, which displays Telnet Designer build and version information.

The following table shows each Telnet Designer icon and describes its function.

Icon	Description
	Create a new project.
	Open an existing project.
	Save the current project.
	Open the Terminal Emulator tool.
	Open the Player Server tool.
	Open the About window, which displays version information about Telnet Designer. This icon appears in the upper right corner of the Telnet Designer window.

Working With Telnet Designer Projects

The Telnet Designer offers the following project options:

- New Project
- Open Project

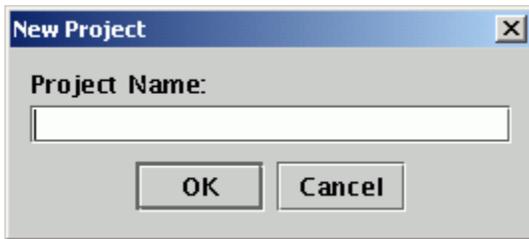
Note: Though Export RPC Repository appears as an option, it is not currently supported.

Procedure: How to Create a New Project

To create a new Telnet Designer project:

1. From the Project menu, select *New Project*.

The New Project dialog box opens, requesting a name for the project, as shown in the following image.



2. Type a name for the new project.
3. Click *OK*.

The new project node, with its subfolders, appears in the left pane.

To exit the New Project window at any time, click *Cancel*.

Procedure: How to Open an Existing Project

To open an existing project:

1. From the Project menu, select *Open Project*.

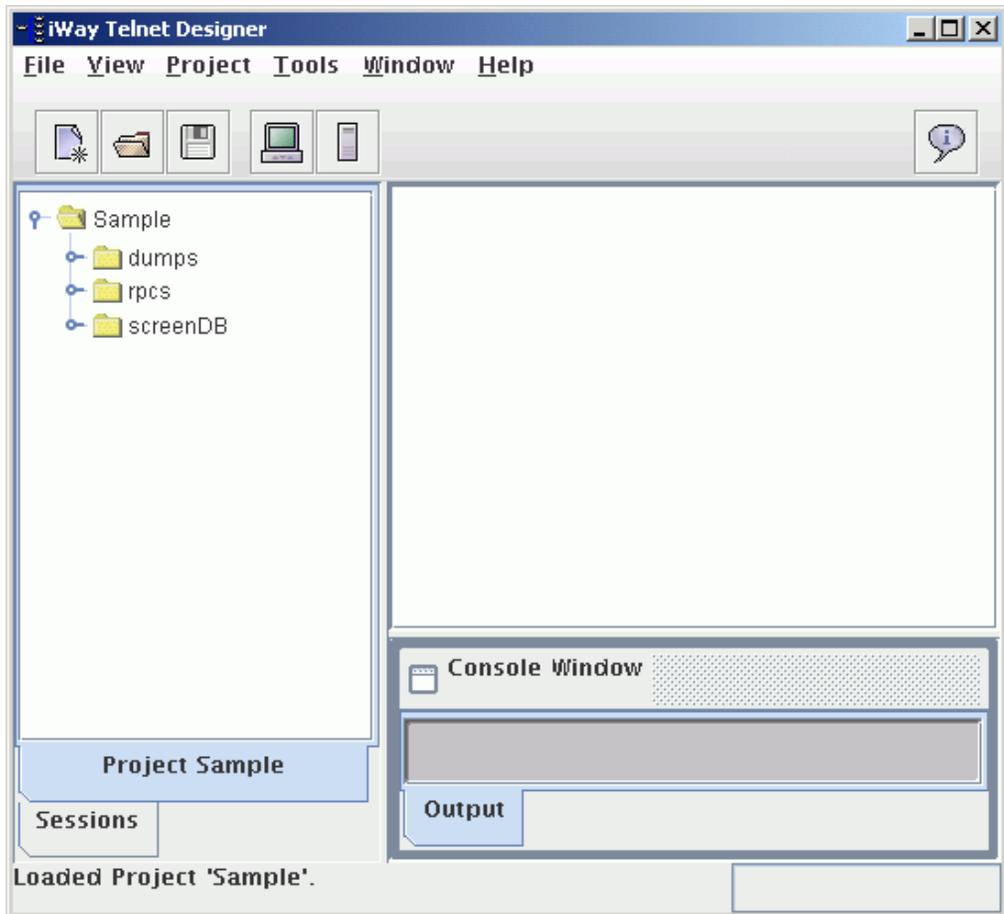
The Open Project dialog box opens displaying a list of existing Telnet Designer projects.

2. Select a project from the Existing Projects list.
3. Click *Open*.

The selected project, with its subfolders, appears in the left pane. The project tab at the bottom of this pane displays the project name.

Project Tab

When you open or create a project, the project tab in the left pane displays the name of the current project and a series of subfolders are displayed in the pane, as shown in the following image.



As you design with Telnet Designer, the project items are saved to the following folders:

- dumps.** Contains dump files created using Recorder mode.
- rpcs.** Contains sessions designed using RPC mode.

- ❑ **screenDB.** Contains screens, with a screen identifier, from all design sessions in the project. Screens that are identical between design sessions are automatically identified when encountered during a new design session.

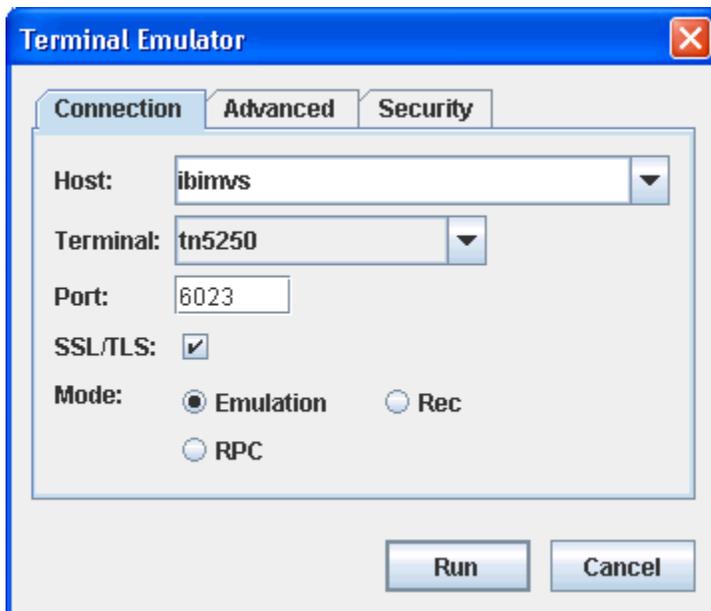
Telnet Designer Tools

Telnet Designer offers the following selections under the Tools menu:

- ❑ Emulator
- ❑ Player Server
- ❑ Options

Emulator Tool

Access the Emulator tool from either the main menu (Tools, then Emulator) or from the Emulator tool icon. The Terminal Emulator dialog box opens with the Connection tab displayed, as shown in the following image. In this window, you set the parameters that allow you to connect to the system you want to emulate, and select the Telnet Designer mode in which you will work.



The following table lists and describes the parameters available in the Terminal Emulator Connection tab.

Parameter	Description
Host	DNS name or IP address of the system you will connect to for the emulation session.
Terminal	Type of terminal you will use for the emulation. The available selections are tn3270 and tn5250.
SSL/TLS	This option allows you to enable a Secure Sockets Layer (SSL)/Transport Layer Security (TLS) security connection.
Port	Port number of the connection.
Mode	Emulation mode that Telnet Designer will use for the session. The modes are Emulation, RPC (Remote Procedure Call), and Rec (Recorder).

Click Run to connect to the designated system. Click Cancel to exit the Terminal Emulator dialog box.

The Advanced tab of the Terminal Emulator dialog box is shown in the following image. The Advanced tab provides additional settings to further define the connection.



The following table lists and describes the parameters available in the Terminal Emulator Advanced tab.

Parameter	Description
Extended Attributes	<p>Allows the session to send extended attributes from the back-end application. These attributes are returned to the application without modification. The following attributes are allowed: background color, character set, field outlining, field validation, and foreground color.</p> <p>Note: If you select a code page in the Language parameter that supports double byte character set (DBCS) code pages, the extended attributes parameter is the default.</p>
Language	The code page for the language used by the host system.

Parameter	Description
LU Name	Allows 3270 application users to specify a particular terminal name (LU) or Pool name (LU pool) to use in its connection with the mainframe. As a result, the mainframe can then dedicate specific connections and privileges to specific telnet ports.

Click Run to connect to the designated system. Click Cancel to exit the Terminal Emulator dialog box.

The Security tab of the Terminal Emulator dialog box is shown in the following image. When the SSL/TLS check box is selected in the Connection tab, the Security tab provides additional security settings that must be defined.



The following table lists and describes the parameters available in the Terminal Emulator Security tab.

Parameter	Description
SSL Version	<p>Select one of the Secure Sockets Layer (SSL) and Transport Layer Security (TLS) protocol versions to use for the connection:</p> <p><input type="checkbox"/> SSL v3</p> <p><input type="checkbox"/> TLS v1</p> <p>By default, <i>TLS v1</i> is selected.</p>
Server Certificate	<p>Select one of the following server certificate options:</p> <p><input type="checkbox"/> Always Accept</p> <p><input type="checkbox"/> Ask Before Accepting</p> <p>By default, <i>Always Accept</i> is selected.</p>
Preferred CipherSuite	<p>Select an available CipherSuite to use for the connection from the drop-down list.</p> <p>By default, <i>None</i> is selected.</p>

The implementation of the SSL/TLS security connection relies on the implementation of Oracle Java Secure Socket Extension (JSSE). JSSE is included as a standard component of JRE Version 1.4 and higher. SSL Version 3.0 and TLS Version 1.0 are currently supported by iWay Emulation Adapter (3270/5250).

iWay Emulation Adapter (3270/5250) uses its own trust store file to store server certificates. The file is called `iway_telnet_jssecacerts` and will be created in the following directory:

`<JRE-home>\lib\security`

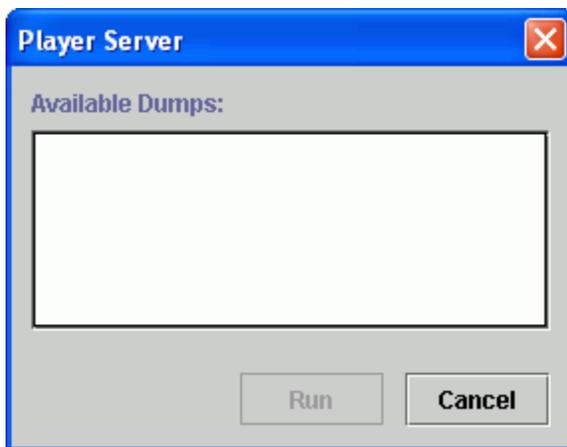
If the *Always Accept* value is selected in the Security tab of the Telnet Designer for the Server Certificate parameter or `ACCEPTCERTIFICATE='1'` is included in the RPC scripts, then an unrecognized server certificate will be stored in the trust store file. If the *Ask Before Accepting* value is selected in the Security tab of the Telnet Designer for the Server Certificate parameter or `ACCEPTCERTIFICATE='2'` is included in the RPC scripts, then a dialog window with the certificate information is displayed and you must decide whether or not to accept the server certificate.

You can also select a cipher suite to use for encryption and integrity check purposes. However, it is possible that a server may not support the preferred cipher suite and a connection will not be established as a result. If no preferred cipher suite is selected, the Telnet client will negotiate with the server based on a set of cipher suites and use one that both parties can support.

The Record mode of the Telnet Designer still records unencrypted data. As a result, you can not use SSL/TLS to connect to a player server, even if the recorded dump is recorded from a SSL/TLS session.

Player Server Tool

To access the Player Server tool, click Tools from the menu bar and select Player Server. You can also click the Player Server icon on the toolbar. The Player Server dialog box opens, as shown in the following image.



The Player Server dialog box allows you to run prerecorded emulations that were created in Recorder mode. A selection of prerecorded emulation files appears in the Available Dumps list. Click Run to activate the selected simulation. Click Cancel to exit the Player Server.

Options

You can edit certain attributes for the Emulator and Player Server tools through the Options dialog box. To access the Options dialog box, click Tools from the menu bar and select Options.

The available options appear in the Options dialog box under the following tabs:

- Emulator

Player Server

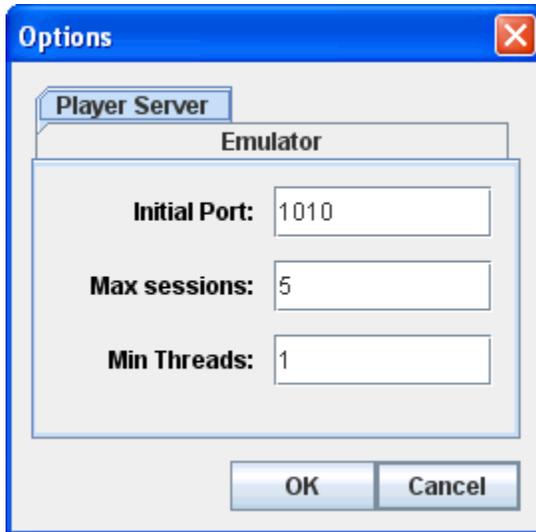
The Options dialog box is shown in the following image with the Emulator tab selected.



The following table lists and describes the Emulator options.

Option	Description
Font Size	Determines the font size of the emulation.
Auto Reconnect	Automatically re-establishes the emulator session if the connection to the host is lost.

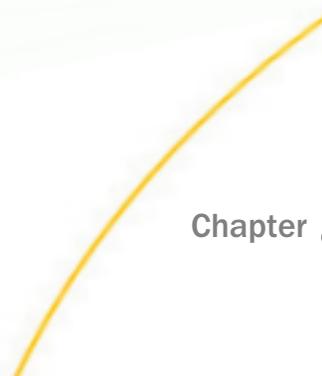
The Options dialog box is shown in the following image with the Player Server tab selected. These options set the attributes used when running the Player Server tool to connect to a recorded dump.



The following table lists and describes the Player Server options.

Option	Description
Initial Port	The port on the local machine used to connect to a recorded dump. Each new player session will automatically select a new port number in this port sequence, adding one to the previous port number.
Max sessions	The maximum sequence of port numbers allocated to the player server. As each new player session is opened, a new session in this sequence of numbers will be assigned. Port numbers in the sequence are reused after all numbers in the sequence have been assigned. This also indicates the maximum concurrent number of player sessions that can be in use.
Min Threads	The minimum number of processing threads that are allocated to the current player session.

Click OK to activate the settings. Click Cancel to exit the Options dialog box.



Chapter 3

Using Remote Procedure Call Mode

The Remote Procedure Call (RPC) mode allows you to generate an RPC containing an emulation that accesses a discrete piece of information in a legacy mainframe application.

Using the Telnet Designer, you can run the mainframe application, identify the specific screens and fields of the particular transaction you want to emulate, and then save it to an RPC that can be used by the client application at run time. The RPC can be saved as a stand-alone Java program.

In this chapter:

- [Remote Procedure Call Mode Overview](#)
 - [Creating a Transaction Module](#)
-

Remote Procedure Call Mode Overview

The Remote Procedure Call (RPC) mode allows you to generate specialized Java source for the RPC containing an emulation that accesses a discrete piece of information in a legacy mainframe application.

At design-time, you use the iWay Emulation Adapter (3270/5250) Telnet Designer to connect to a mainframe application, then navigate and capture the application transaction you want to extract. This requires identifying the screens, input fields, and values necessary to access the information you want, and identifying the fields that you want returned by the transaction to the client application. You save this information as an RPC program, at which time you have the option to generate a stand-alone RPC Java program for use on other application servers.

You compile the RPC program to generate an RPC class, which can then be used by the client application at run time. This RPC class is also referred to as a transaction module because it holds the information to perform a specific transaction using an application, for example, retrieving customer account information.

At run time, your client application sends an XML request document containing the RPC class. The RPC class works with the iWay Emulation Adapter (3270/5250) to drive the mainframe application with the required 3270/5250 buffers. In this way, it navigates through the application to the designated data and returns the requested information in an XML document. At run time, your client application can:

- Send information to a mainframe session.** Your client application sends the input parameter variables required by your mainframe application in an XML request document.
- Receive information from a mainframe session.** Your client application receives the designated output data from your mainframe application in an XML response document.

Creating a Transaction Module

A transaction module is the RPC class that defines a single mainframe transaction. The RPC class is used to run the transaction in a client application. Through the Telnet Designer, you design the RPC class by designating the mainframe application screens, input parameters, and target information that make up a transaction.

The process of creating a transaction module consists of:

- Accessing the mainframe application in Telnet Designer.
- Emulating the transaction. This includes identifying the relevant screens, the fields and values (Parameters) you must use to move through the application, and the output fields (Metadata) you want returned to the client application.
- Testing the RPC program to verify that you have correctly identified all the necessary screens and input data to successfully run the RPC, and identified the correct metadata necessary expected from your application.
- Generating the RPC program. You can generate a stand-alone Java program for use in other application servers.

The following sections describe how to perform these tasks.

Accessing the Mainframe Application

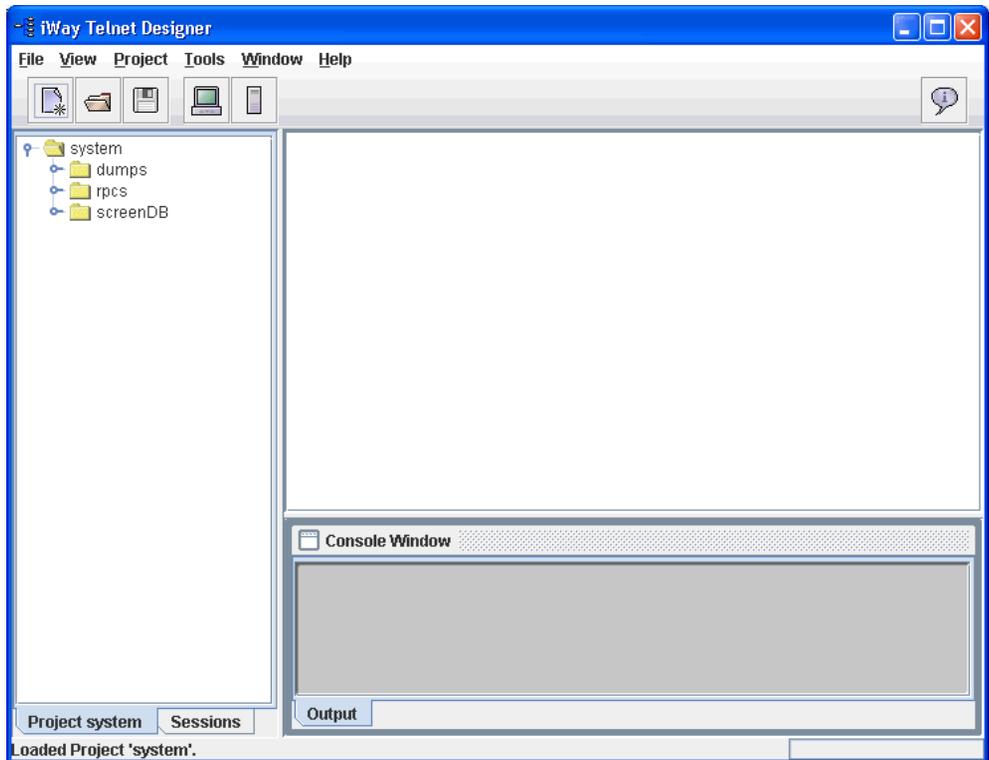
To capture and save an application transaction, you must open the mainframe application within Telnet Designer. Once connected to the application, you can issue commands and navigate the application as you normally would and use the emulation tools available in Telnet Designer to create an RPC program.

Procedure: How to Access a Mainframe Application

To access a mainframe application for an emulation session:

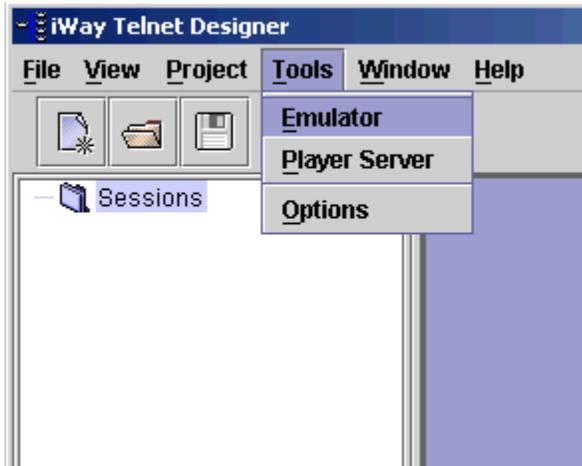
1. Open the Telnet Designer.

The Telnet Designer window opens, as shown in the following image, with the Project tab active in the left pane.

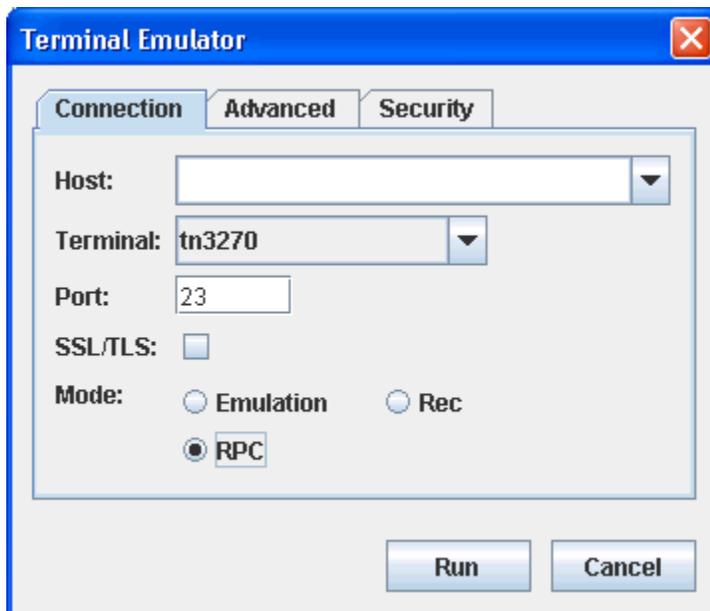


2. At the bottom of the left pane, click the *Sessions* tab.
A *Sessions* folder appears at the top of the left pane.
3. Click *Tools* from the menu bar and select *Emulator*.

The following image shows the Sessions folder in the left pane and the Tools drop-down list.



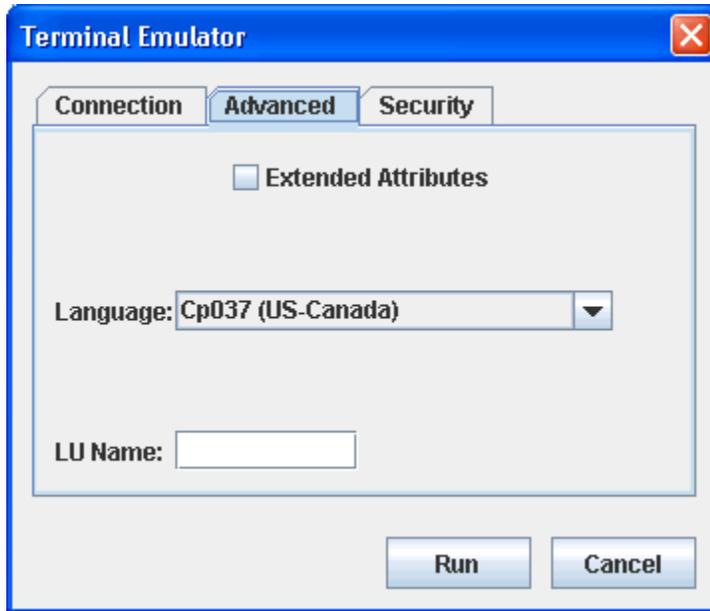
The Terminal Emulator dialog box opens, as shown in the following image. The Connection tab, where you provide information about connecting to the mainframe, is active.



4. From the Host drop-down list, select the mainframe you want to emulate.
5. From the Terminal drop-down list, select the terminal type (*tn3270* or *tn5250*) for the emulation.

6. In the Port field, type the port number to access the host.
7. In the Mode field, click the *RPC* option button.
8. For more emulation options, click the *Advanced* tab.

The Advanced tab of the Terminal Emulator opens, as shown in the following image.



Note: The Extended Attributes option is not operational for the RPC mode.

9. Make a selection from the Language drop-down list, shown in the following image. The Language selection determines the national language character set that will be used in your emulation session.



10. If you want to use a specific terminal name (LU) or pool name (LU pool) with your mainframe connection, type this value in the LU Name field.



The session sub-folders are:

connection. Contains the mainframe application connection information, such as, host, port, type, and language.

parameters. Contains the input fields and data you designate for the transaction.

metadata. Contains the designated output expected from the transaction.

screens. Contains the information for the designated screens in the transaction.

As you build a transaction session, these subfolders become populated with the transaction information.

You can now begin your emulation session, and capture the necessary screens and input and output data, as explained in the following sections.

Capturing a Transaction

To capture an application transaction, navigate through the application and as you proceed:

- Identify a screen that is necessary to the transaction. When the adapter executes the request document at run time, it recognizes these designated screens.
- If the screen contains required input fields (Parameters) that require values at run time, define them to the transaction. The values will be provided in the request document at run time.
- If the screen contains output fields (Metadata) that you want returned at run time in the response document, define them to the transaction.
- Continue to navigate through the application and identify each screen and the input and output fields that are necessary to the transaction.
- Log off the mainframe application and save the emulation session.

The following procedures explain how to perform these tasks.

Note: If you need to include the contents or metadata of a table as input or output in your transaction, see [How to Capture the Contents of a Table](#) on page 44.

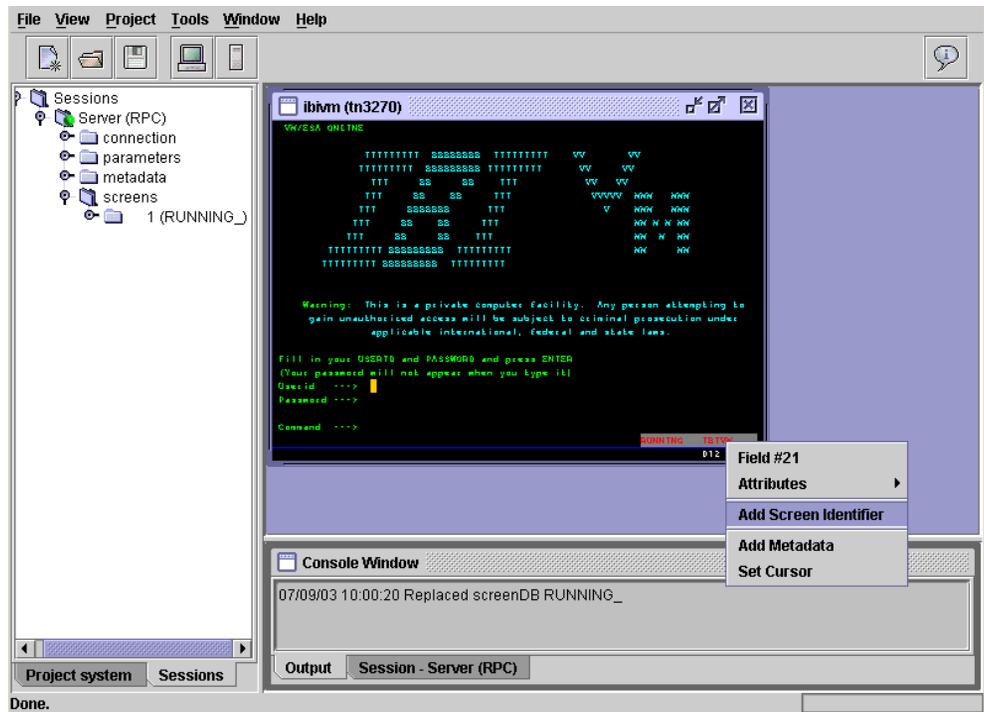
Procedure: How to Identify a Screen

To identify a screen to the transaction module:

1. Determine the field(s) on the 3270/5250 screen that uniquely identify it from the other application screens.

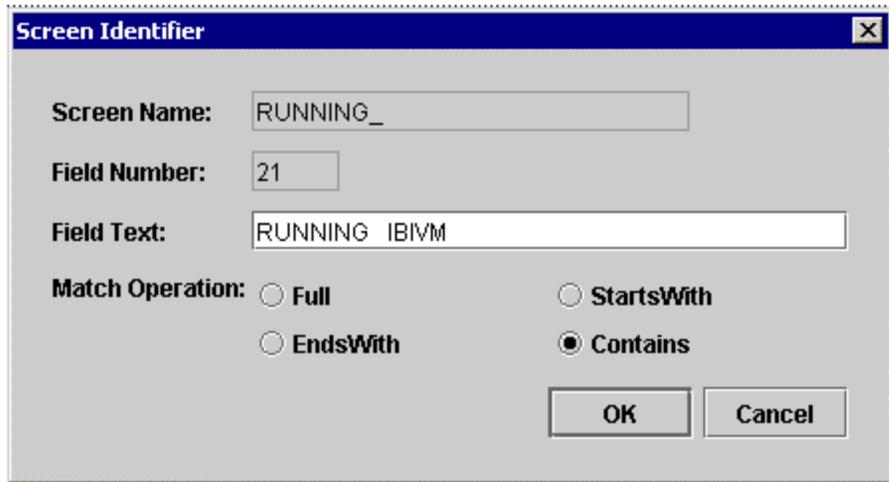
Note: You do not need to identify a blank screen.

If there are several fields, choose one to identify the screen. The following image shows an example of a field named RUNNING selected in the lower left of the screen.



2. Right-click the identifying field and select *Add Screen Identifier*.

The Screen Identifier dialog box opens with prompts for identifying the field, as shown in the following image.



The Screen Name and the Field Number fields are automatically populated based on your selection.

- a. In the Field Text field, type the text that uniquely identifies this screen.
- b. Select an option for Match Operation, which is the relationship of the text you typed in the Field Text field to the complete text of the field in the application. The options are:

Full. The Field Text entry is the complete text of the screen field.

EndsWith. The screen field text ends with the Field Text entry.

StartsWith. The screen field text begins with the Field Text entry.

Contains. The screen field text contains the Field Text entry.

For example, if the field value is OPERATOR INSTRUCTIONS, and you enter OPERATOR INSTRUCTIONS, the field text you entered is the full text of the field on the screen. Therefore, select the Full Match Operation option.

Alternatively, if you entered Instructions for that field, select the EndsWith or Contains Match Operation option.

Note: When a match is made, the adapter proceeds with the keystroke pressed, such as Enter or a PF key. At run time, the screen is processed accordingly.

3. Click OK.

You have identified the screen to the transaction module. A folder with the screen name appears in the left pane, under the screens folder. A folder is created for each screen identified for the session.

Now you can define the appropriate input and output fields, if any, on that screen.

***Procedure:* How to Define an Input Field (Parameter)**

This procedure uses an example transaction, INQY, and an example input parameter, NUMBER, to explain how to define input parameters.

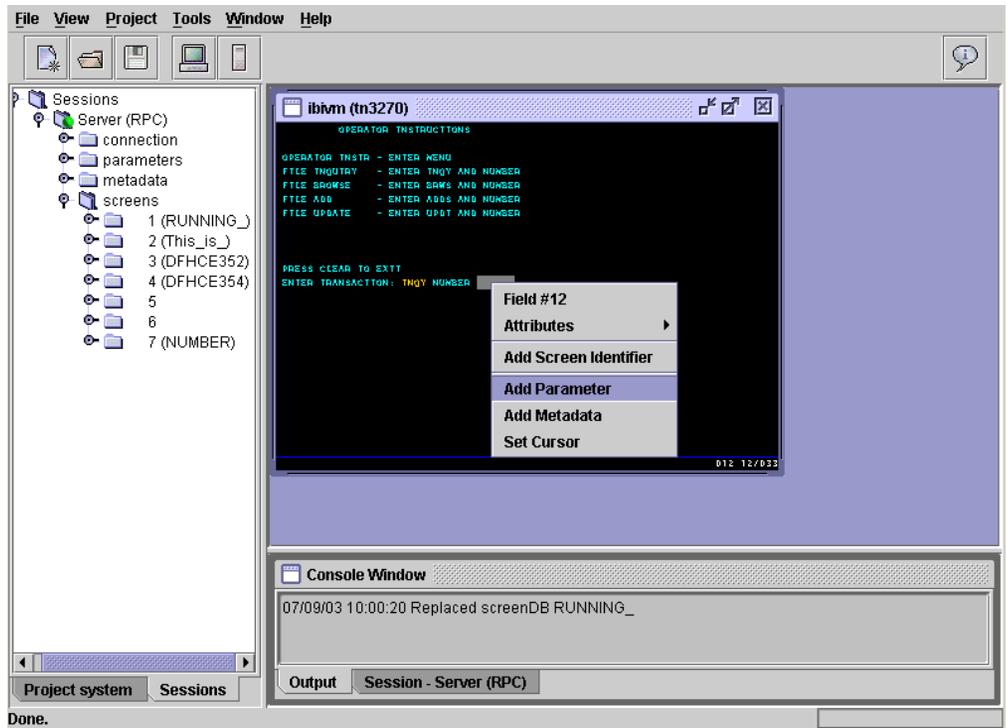
Note: It may not be necessary to define parameters on each screen. Define only those input parameters that are required to navigate the screen, for example userid or password, and is different for each invocation of the RPC request.

To define screen input parameters:

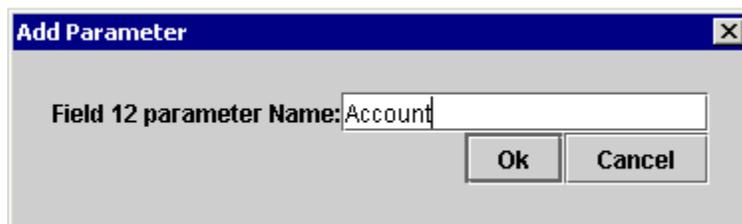
1. From the desired formatted screen, use the cursor to select a required input field.

For example, to identify the ENTER TRANSACTION field of the IBIVM Operator Instructions window, enter the INQY transaction.

- Right-click and select *Add Parameter* from the drop-down list, as shown in the following image.



The Add Parameter dialog box opens and prompts you for a parameter name, as shown in the following image.



- Type a name that appropriately identifies the input parameter, for example, Account.
- Click *Ok*.
- Repeat these steps for the remaining fields that you want to define as input parameters.

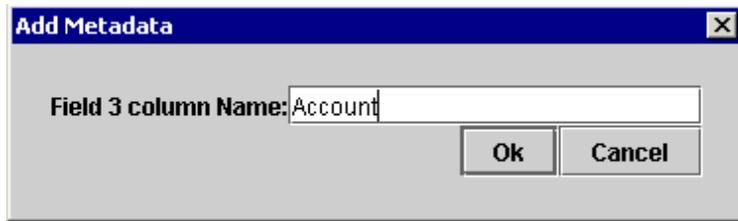
A folder with the parameter name appears in the left pane, under the parameters folder. A folder is created for each parameter identified for the session

Procedure: How to Define an Output Field (Metadata)

To define the output fields that you want returned by the transaction module as part of the answer set:

1. From the desired formatted screen, use the cursor to select a desired output field.
2. Right-click and select *Add Metadata* from the drop-down list

The Add Metadata dialog box opens and prompts you to enter a name, as shown in the following image.



3. Type a name that appropriately identifies the output metadata.
4. Click *OK*.
5. Repeat these steps for the remaining fields that you want returned as output.

A folder with the output field name appears in the left pane, under the metadata folder. A folder is created for each output field identified for the session

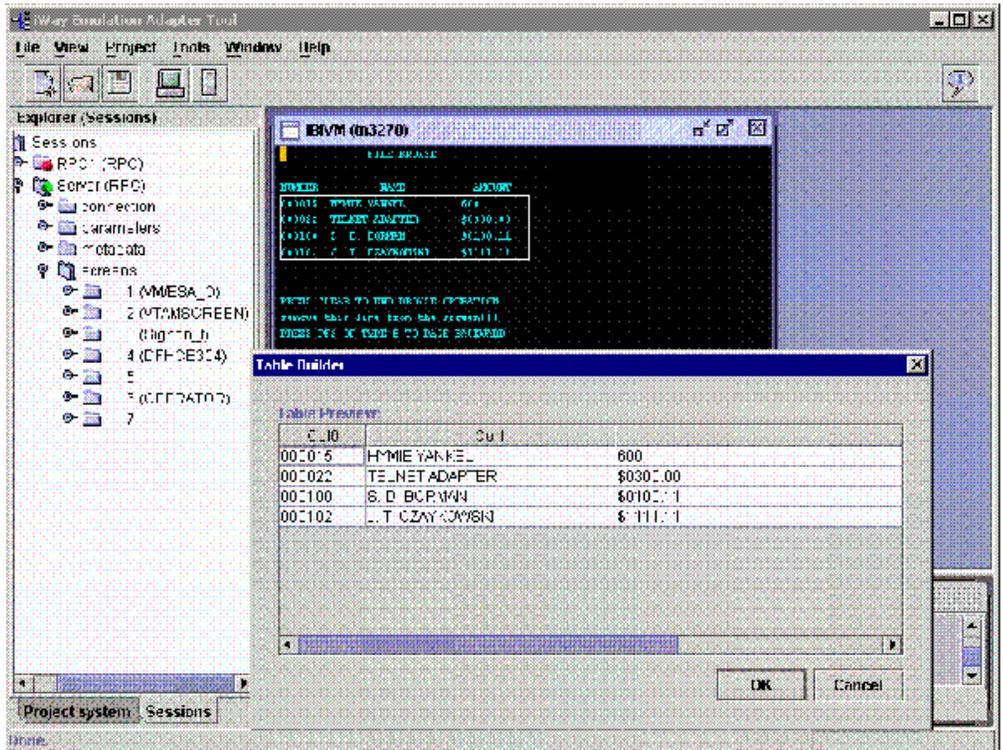
Procedure: How to Capture the Contents of a Table

There are times when the mainframe application consists of a screen that displays multiple rows of data, such as an inquiry or broBSE program. The iWay Emulation Adapter (3270/5250) allows you to capture the screen once for any number of records that make up that table. For example, a MENU CICS transaction broBSE function that displays a number of records.

To retrieve all of the records if a table:

1. Click the cursor to the immediate left of the first column of the first record (left corner of the table) and drag it to the immediate right of the last column of the table.

The Table Metadata window opens, displaying the contents of the table in a row and column format. An example of this window is shown in the following image.



2. If you want to modify the name of a column, double-click it and make the appropriate change.
3. Click OK to save the table. The table metadata and output information are automatically saved.

When you run RPC program, the output of the program will contain a record-like answer set with all of the information displayed as columns.

Procedure: How to Save the Transaction Session

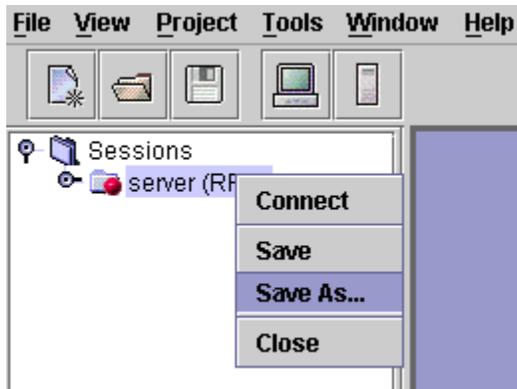
When you are finished identifying screens, input, and output field, save the transactions session, as follows:

1. Log off the mainframe application.

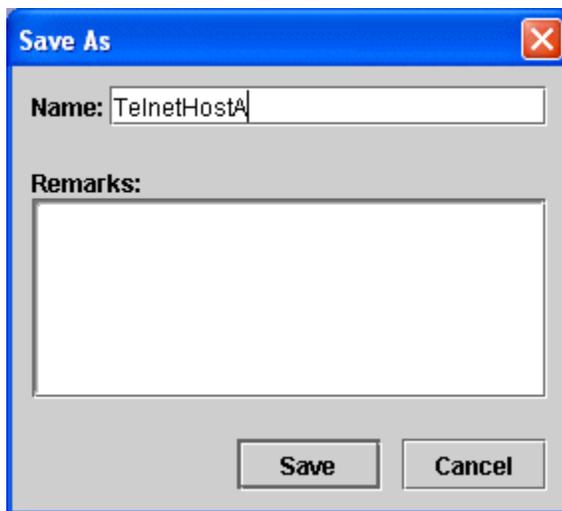
Note: The transaction module signs off the application in the same manner.

2. Right-click the server (RPC) icon under the Sessions folder and select Save As from the drop-down list.

The following image shows the session drop-down list.



The Save As dialog box opens and prompts you to type a name for the save document, as shown in the following image.



3. Type a name for the session, for example, *TelnetHostA*.
4. If needed, enter comments in the Remarks field.
5. Click Save.

The requested XML document is saved to

TelnetInstalDir\projects\system\rpcs

where:

TelnetInstalDir

Is the directory into which the emulator product is installed.

system

Is the name of your project. System is the default project name.

The XML request document can be used to generate web services as explained in [Creating XML Schemas and iWay Business Services](#) on page 53.

The new document appears in the left pane under the Sessions folder, as shown in the following image.



Testing the RPC Program

The RPC application can be tested immediately against the mainframe online application. Depending on the connection parameters, it can be tested against a prerecorded mainframe session in which there is no connection to the mainframe.

Testing allows you to verify that you have correctly identified all the required screens and parameters to run the RPC, and that the desired metadata is returned from your application. If you are unable to successfully complete the RPC test, review the transaction and confirm that all the necessary input data is properly assigned, along with the navigation of the transaction through the various screens.

Procedure: How to Unit Test the RPC

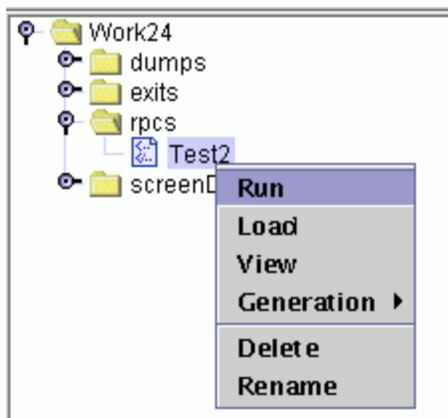
To test an RPC:

1. In the left pane, expand the rpcs node and right-click the RPC you want to test.

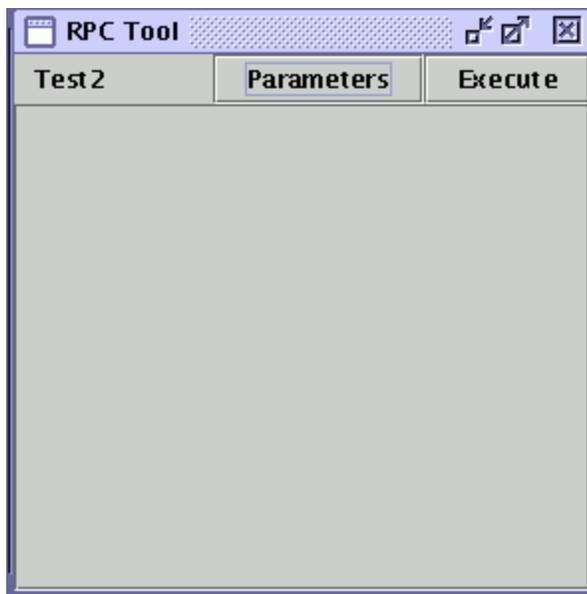
Note: Be sure you are working in the desired project.

2. From the drop-down list, select *Run*.

The following image shows the left pane of Telnet Designer with an example of an RPC program node and its drop-down list.

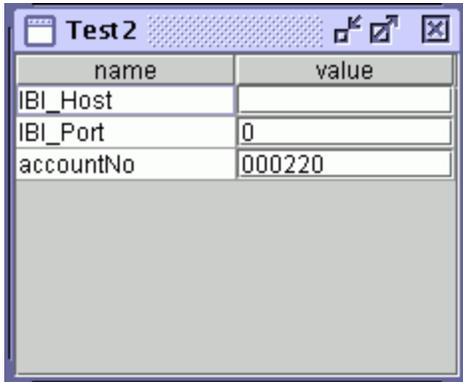


The RPC Tool window opens in the right pane, as shown in the following image:



3. Click *Parameters* to enter the parameter data expected by the RPC application.

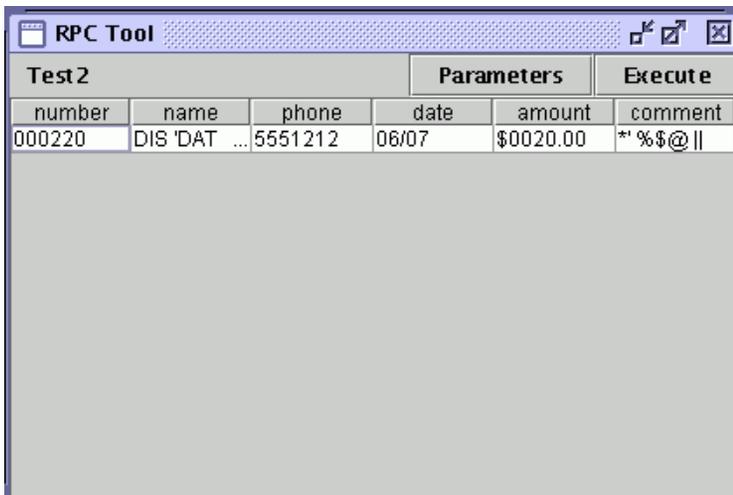
The following is an example of the parameters table in which you can enter the test values.



name	value
IBI_Host	
IBI_Port	0
accountNo	000220

- Click *Execute*. The program runs the CICS MENU transaction to return Account, Address, and Amount information.

The following image shows an example of test results where the program returns the information for the record with account number 000022.



Test2			Parameters	Execute	
number	name	phone	date	amount	comment
000220	DIS 'DAT ...	5551212	06/07	\$0020.00	*' %\$@

The RPC has been tested successfully. You can now generate a Java program from the RPC.

Generating the RPC Program

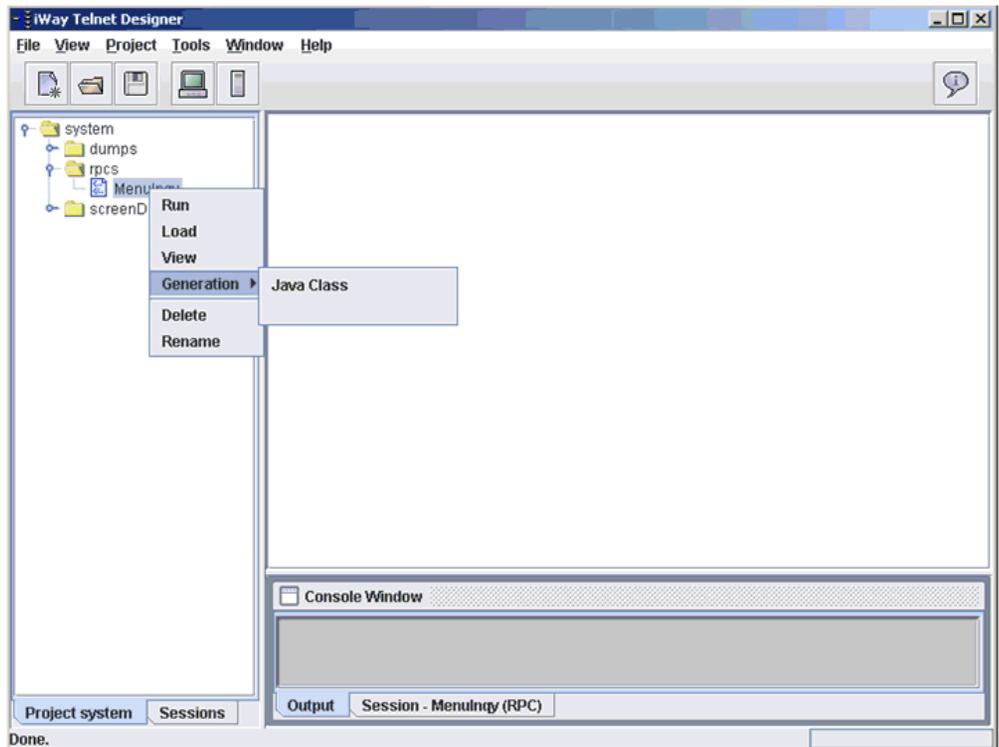
You can generate an RPC program of your emulation session, a Java program for use as a standalone Java client, or as a service to be imported into the iWay Emulation Adapter.

Procedure: How to Generate the RPC Program

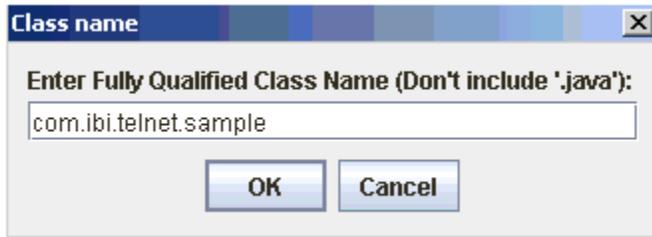
To generate an RPC program:

1. In the left pane of Telnet Designer, click the *Project system* tab.
2. Expand the *system* folder and then, expand the *rpcs* subfolder.
3. Right-click the RPC design project, for example, *MenuInq*, and select *Generation*.

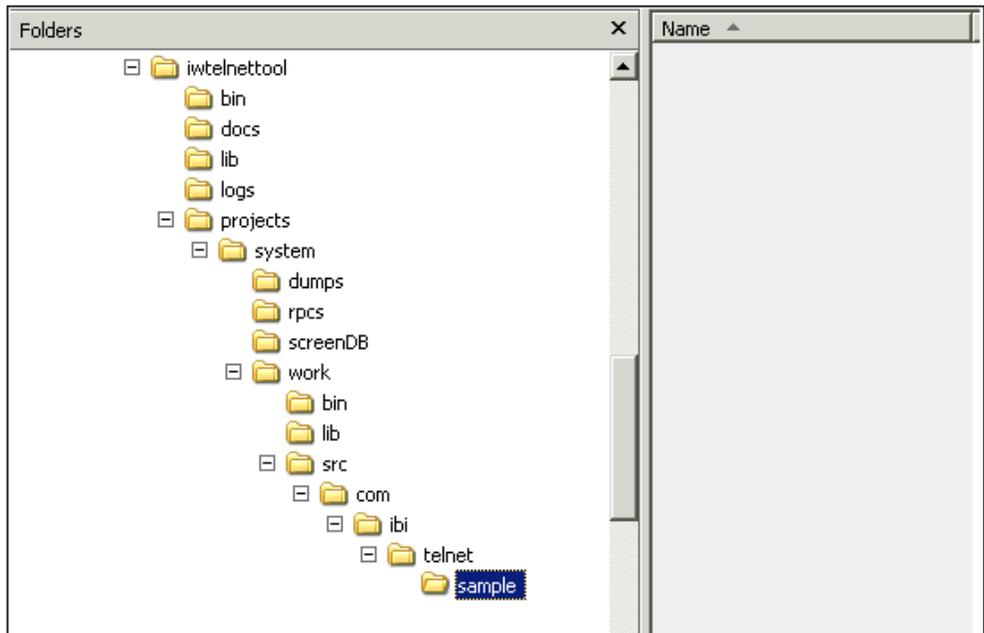
The following image shows the expanded *rpcs* subfolder and the drop-down list of the project.



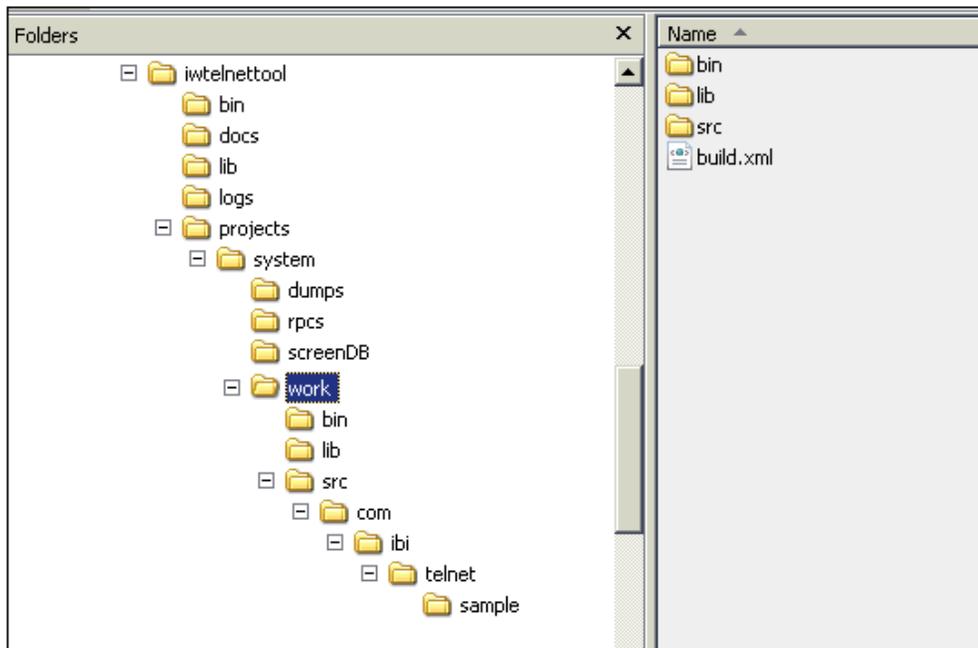
To generate a Java program that can be included in your client application or run as a stand-alone component, select Java Class and enter the fully qualified name of the Java class you want to generate.



The iWay Telnet Designer generates the class under the work subfolder of your current project.



The iWay Telnet Designer also generates artifacts that can be used to compile and run the Java program using Apache Ant.



Chapter 4

Creating XML Schemas and iWay Business Services

This section describes how to create XML schemas and iWay Business Services that will be used to execute the iWay Emulation Adapter (3270/5250).

In this chapter:

- ❑ [Creating an Adapter Transaction](#)
- ❑ [Understanding iWay Business Services](#)
- ❑ [Creating iWay Emulation Adapter \(3270/5250\) iWay Business Services](#)

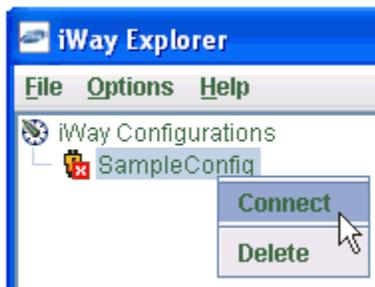
Creating an Adapter Transaction

After you have used the iWay Telnet Designer to create a project containing one or more RPCs, you can import them to the iWay Emulation Adapter in iWay Explorer by specifying the full path to the root of the project.

Procedure: How to Import a Telnet Project

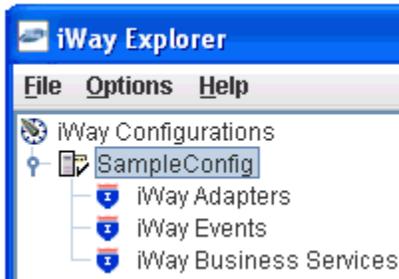
To import a Telnet project:

1. Open iWay Explorer.

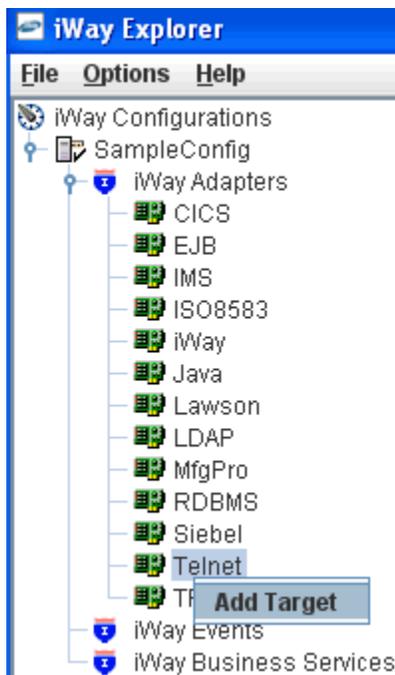


2. Right-click an available configuration to which you want to connect (for example, SampleConfig) and select *Connect* from the context menu.

The following image shows the left pane, where nodes appear for iWay Adapters, iWay Events, and iWay Business Services (also known as web services).

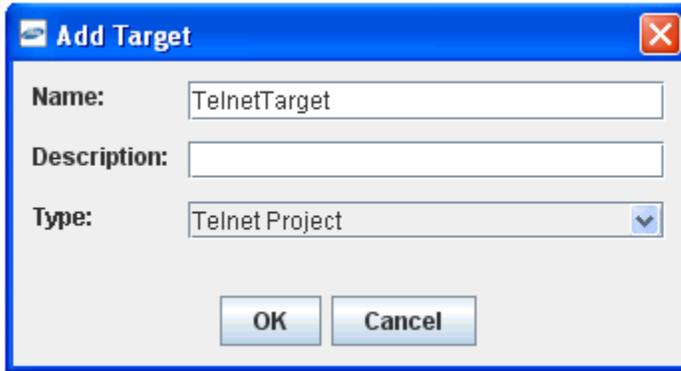


3. In the left pane, expand the *iWay Adapters* node and select the *Telnet* node.



4. Right-click the *Telnet* adapter node and select *Add Target*.

The Add Target dialog box opens.



5. In the Name field, type a descriptive name for the target, for example, TelnetTarget.
6. In the Description field, type a brief description of the connection (optional).
7. From the Type drop-down list, select *Telnet Project*.
8. Click *OK*.

The Telnet Project dialog box opens, as shown in the following image.



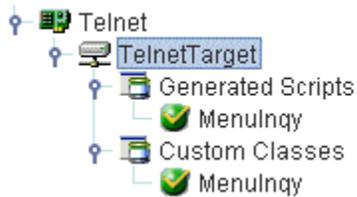
9. Specify the full path to the Telnet project in the Project Folder field.
10. Click *OK*.

The new target, for example, TelnetTarget, appears in the left pane beneath the Telnet node.



11. Right-click the target, for example, TelnetTarget, and select *Connect*.

In the left pane, the TelnetTarget node changes to reflect that a connection was made.



Selecting a service node will provide the details of the RPC connection and the associated XML request and response schemas for the service in the right pane of iWay Explorer. Right-clicking on a service node will allow you to test execute the service and to edit the connection details and default parameter values for the service. If you have edited the service and want to restore the original values from the imported project, a Restore Settings option is available.

Understanding iWay Business Services

iWay Explorer provides web developers with a simple, consistent mechanism for extending the capabilities of the iWay Emulation Adapter (3270/5250). The iWay Business Services Provider (iBSP) exposes functionality as iWay Business Services (also known as web services). It serves as a gateway to heterogeneous back-end applications and databases.

A web service is a self-contained, modularized function that you can publish and access across a network using open standards. It is the implementation of an interface by a component and is an executable entity. For the caller or sender, a web service can be considered a black box that may require input and that delivers a result. Web services integrate within an enterprise as well as across enterprises on any communication technology stack, whether asynchronous or synchronous, in any format.

Creating iWay Emulation Adapter (3270/5250) iWay Business Services

When using iWay Telnet Designer in RPC mode, iWay Telnet Designer automatically creates an XML document for the RPC session that is saved. This XML document is a script that is based on the saved session. You can create an iWay Business Service (web service) for the iWay Emulation Adapter (3270/5250) using this generated XML document.

Procedure: How to Create an iWay Business Service

To create an iWay Business Service using an XML document generated by iWay Telnet Designer:

1. Follow the instructions in [Using Remote Procedure Call Mode](#) on page 33, to generate an RPC session. An XML document of this session is automatically generated.

2. Open iWay Explorer, create, and then connect to an emulation adapter (Telnet) target node.

For more information, follow the steps in [How to Import a Telnet Project](#) on page 53.

3. In the left pane, expand the target node, followed by the *Generated Scripts* node.
4. To generate the request and response schema, select the XML document that corresponds to your RPC session.

The Request Schema and Response Schema tabs appear in the right pane. To view the XML for each schema type, click the appropriate tab.

5. Right-click the XML document from which you want to create a business service and select *Create Web Service*.

The Create Web Service dialog is displayed.

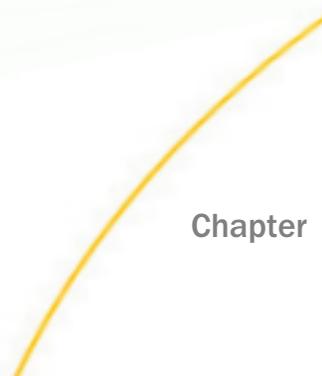
6. Perform the following steps:
 - a. From the Existing Service Names drop-down list, select either *<new service>* or an existing service.
 - b. If you are creating a new service, specify a service name. This name identifies the web service in the list of services under the Business Services node.
 - c. Enter a brief description for the service (optional).

7. Click *Next*.

The License and Method dialog is displayed.

8. Perform the following steps:
 - a. In the License Name field, select one or more license codes to assign to the web service. To make multiple selections, press the Ctrl key and click the licenses.
 - b. In the Method Name field, enter a descriptive name for the method.
 - c. In the Method Description field, enter a brief description of the method.
9. Click *OK*.

iWay Explorer switches the view to the Business Services node, and the new iWay Business Service (web service) appears in the left pane.



Chapter 5

Using Emulation and Recorder Modes

The iWay Emulation Adapter (3270/5250) provides an Emulation mode in which you can access a mainframe session directly from your workstation using Telnet Designer. Telnet Designer displays standard 3270/5250 screens.

The adapter also offers a Recorder mode in which you can record an emulation session for use at a later time, for example, to simulate a connection to the mainframe for debugging purposes.

This section explains how to use the iWay Emulation Adapter (3270/5250) in Emulation Mode and Recorder Mode.

In this chapter:

- [Using Emulation Mode](#)
 - [About Recorder Mode](#)
 - [Creating a Prerecorded File](#)
 - [Developing Against a Prerecorded File](#)
-

Using Emulation Mode

The adapter Emulation mode enables you to access a mainframe session directly from the iWay Emulation Adapter (3270/5250) Telnet Designer. This is a simple emulation that displays standard 3270/5250 screens and does not create any work files on your system.

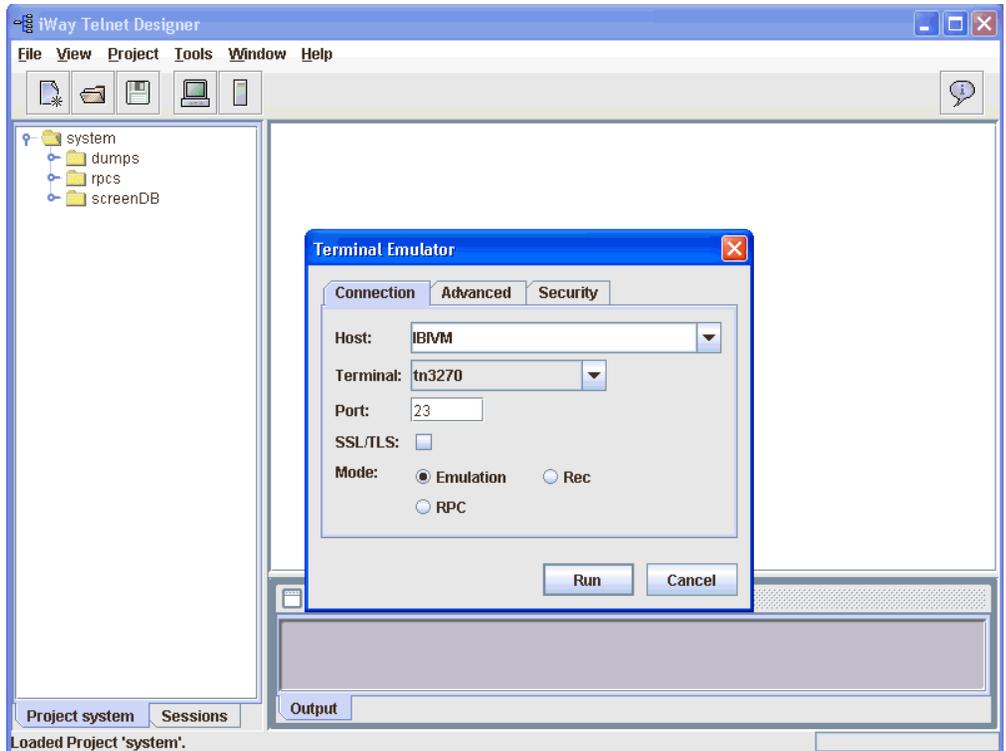
Emulation mode enables you to access the mainframe as you develop Telnet applications.

***Procedure:* How to Run Emulation Mode**

To run the adapter in Emulation mode:

1. From the Telnet Designer main menu, select *Tools* and then *Emulator*. You can also click the Emulator Tool icon.

The Terminal Emulator opens in the right pane with the Connection tab active, as shown in the following image.



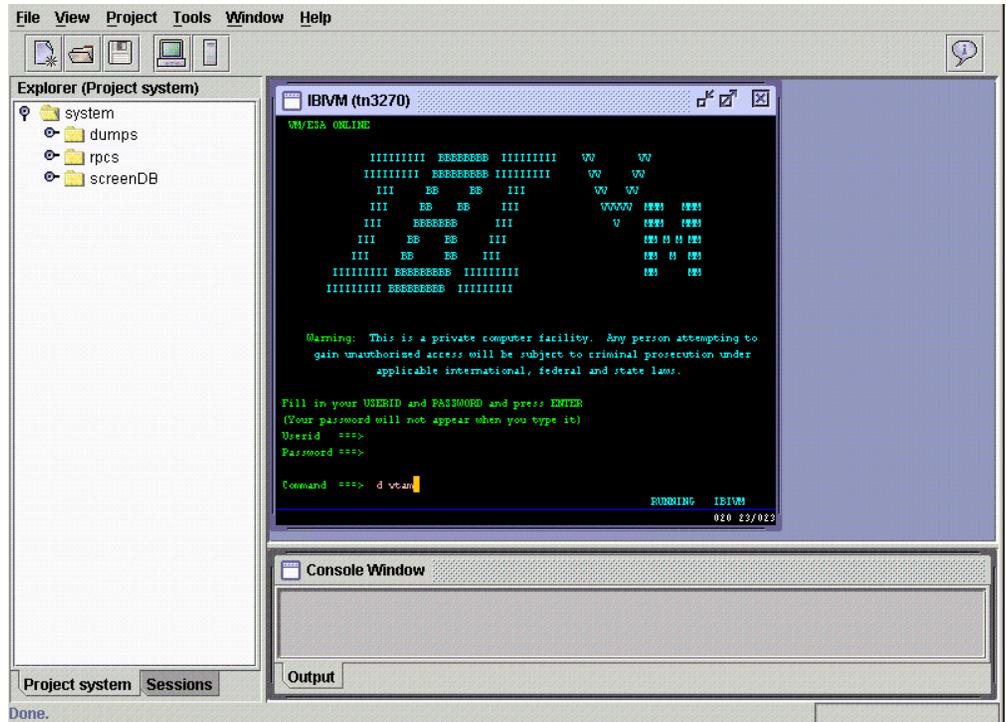
2. On the Connection tab:
 - a. From the Host drop-down list, select the system host you want to emulate.
 - b. From the Terminal drop-down list, select either *tn3270* or *tn5250* as the terminal type used in the emulation.
 - c. In the Port field, type the port number through which you will connect to the system terminal.
 - d. Select *Emulation* as the Mode option.
3. For more emulation options, click the *Advanced* tab.

The Advanced tab of the Terminal Emulator opens. Make a selection from the Language drop-down list. The Language selection determines the national language character set that will be used in your emulation session.

If you want to use a specific terminal name (LU) or pool name (LU pool) with your mainframe connection, type this value in the LU Name field. This option allows the mainframe to dedicate specific connections and privileges to specific telnet ports.

4. Click *Run*.

A connection is made to the mainframe online system and the initial mainframe screen opens. The following image is an example of a mainframe screen in Telnet Designer.



5. Enter the appropriate information to navigate through the mainframe online system of your site.

Terminate the emulation session at any time by clicking the X in the upper right corner of the mainframe window.

About Recorder Mode

iWay Emulation Adapter (3270/5250) Recorder mode enables you to capture your mainframe application screens and end user keystrokes using Telnet Designer in terminal mode and then stores these screens and keystrokes in a binary file.

This file can then be used by Player Server to simulate a connection to the mainframe, allowing you to continue your development without a live connection. Capturing a session in Recorder mode is useful for offline development, testing, benchmarking, prototyping, debugging, and demonstration purposes.

Creating a Prerecorded File

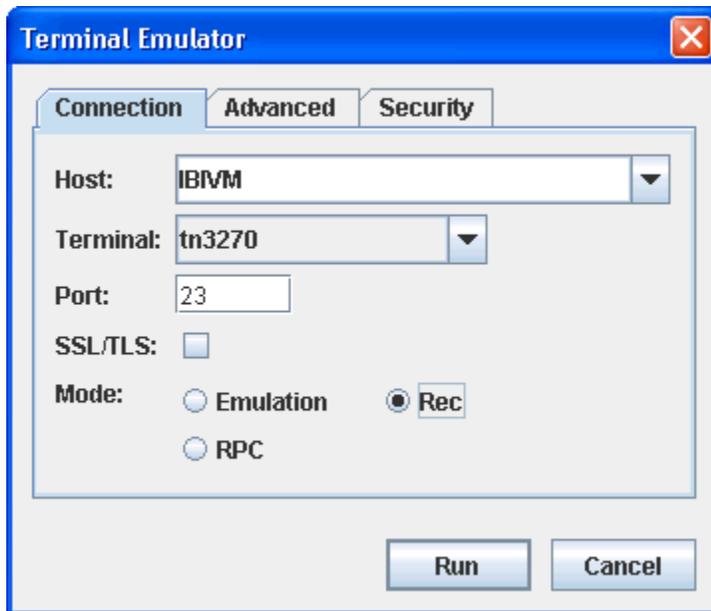
Use the Recorder mode to create a file that can be used with Player Server to simulate a live connection to the mainframe. Each screen, keystroke, and text entry that you enter is recorded into a dump file. When you play it back with the Player Server, this recorded session is played back exactly as you navigated through your screens. This allows you to design RPC mode sessions against these screens or use the session for offline testing or debugging.

Procedure: How to Record an Emulation Session

To use Telnet Designer in Recorder (REC) mode:

1. From the Telnet Designer main menu, select *Tools* and then *Emulator*. You can also click the Emulator Tool icon.

The Terminal Emulator window opens with the Connection tab active, as shown in the following image.



2. On the Connection tab:
 - a. From the Host drop-down list, select the system host from which you want to record.
 - b. From the Terminal drop-down list, select either *tn3270* or *tn3250* as the terminal type used in the session.
 - c. In the Port field, type the port number through which you will connect to the system.

- d. Select *Rec* as the Mode option.
3. For more emulation options, click the *Advanced* tab.

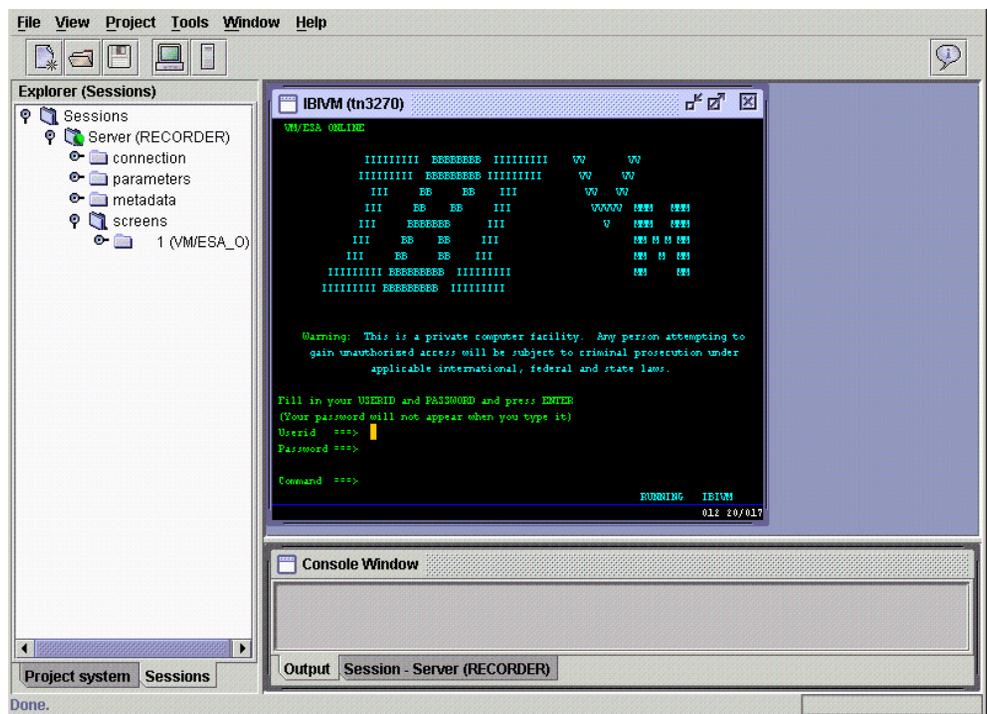
The Advanced tab of the Terminal Emulator opens. Make a selection from the Language drop-down list. The Language selection determines the national language character set that will be used in your emulation session.

If you want to use a specific terminal name (LU) or pool name (LU pool) with your mainframe connection, type this value in the LU Name field. This option allows the mainframe to dedicate specific connections and privileges to specific telnet ports.

4. Click *Run*.

A connection is made to the mainframe online system.

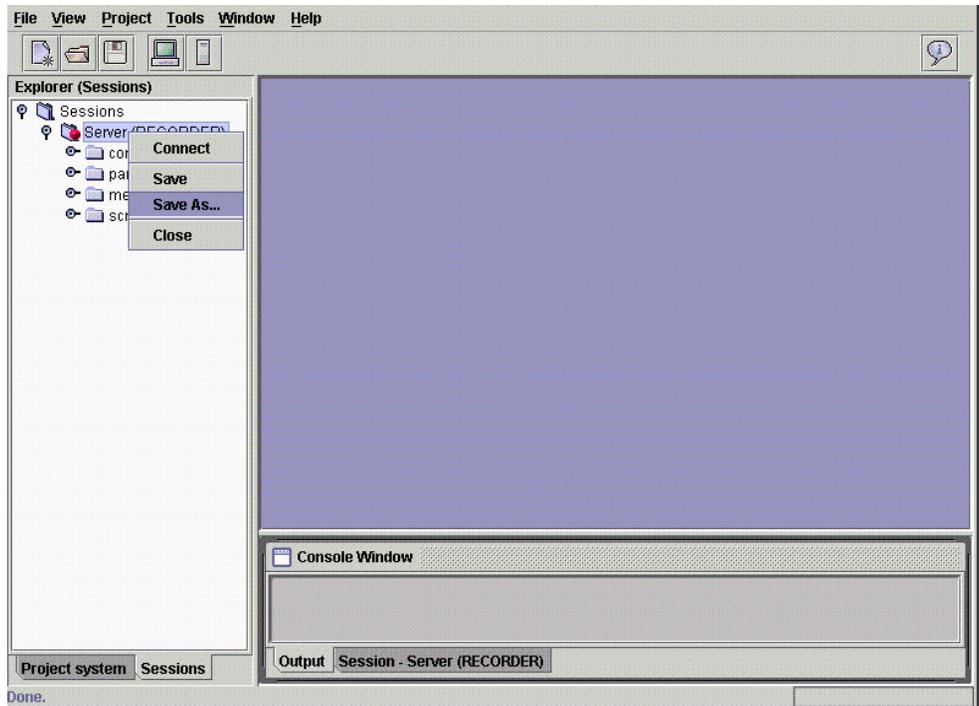
The mainframe session window opens in the right pane of Telnet Designer. The following image shows an example of a mainframe window in Telnet Designer.



5. Enter the appropriate information to navigate through the mainframe online system, as needed.

As you move through each screen of the mainframe, session information is written to a file.

6. When you are finished with the mainframe session, log off of the mainframe. For example, for CICS, issue the CESF LOGOFF command.
7. Close the mainframe session window by clicking the X in the upper right of the mainframe window.
8. To save the prerecorded file, right-click the *Server (RECORDER)* node in the left pane and select *Save As*, as shown in the following image.



The Save As dialog box opens, as shown in the following image.

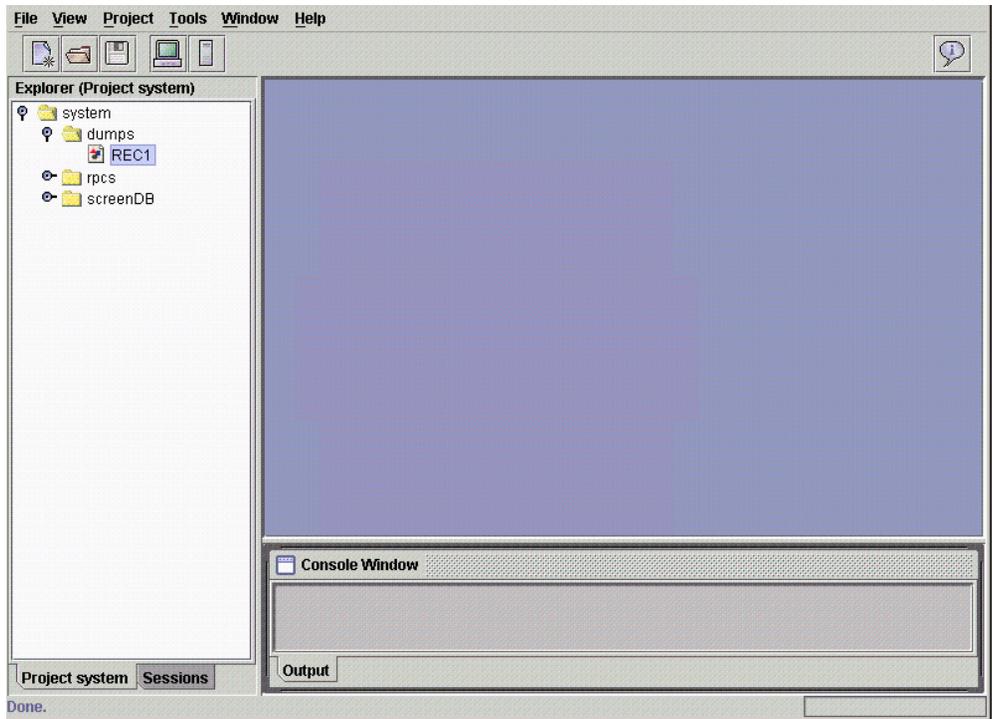


9. In the Name field, type a name for the recorded session file, for example, REC1.

Note: Entering information in the Remarks field is optional.

10. Click Save.
11. In the left pane of Telnet Designer, click the *Project* tab and expand the *dumps* folder. When the recorded session is saved, it appears under the dumps folder.

The following image shows an example prerecorded file, REC1, under the dumps folder.



You are ready to develop against the prerecorded file.

Developing Against a Prerecorded File

The Player Server executes against a prerecorded file containing your recorded session activity. You can create several files where each one can simulate a specific online application, such as a browse transaction or an update transaction. You can also create one large file that encompasses many mainframe transactions, enabling, for example, two or more developers to work on separate transactions on a laptop that is disconnected from the actual mainframe.

You have all options available to create an iWay Emulation Adapter (3270/5250) application against a prerecorded file. As explained previously, you can run the Telnet Designer to create an RPC solution. The difference when running against a prerecorded file, is that development is not running against the mainframe. There is no mainframe connection.

This section provides procedures that describe how to:

- Start a player session against a prerecorded file.

- ❑ View or change the Player Server connection information.

Telnet Designer enables you to control the port on which the Player Server is running. The default port is 1010. You can change the port number to any desired number. The port number is used to connect to the Telnet session to create an adapter application.

- ❑ Run Telnet Designer against a prerecorded file.

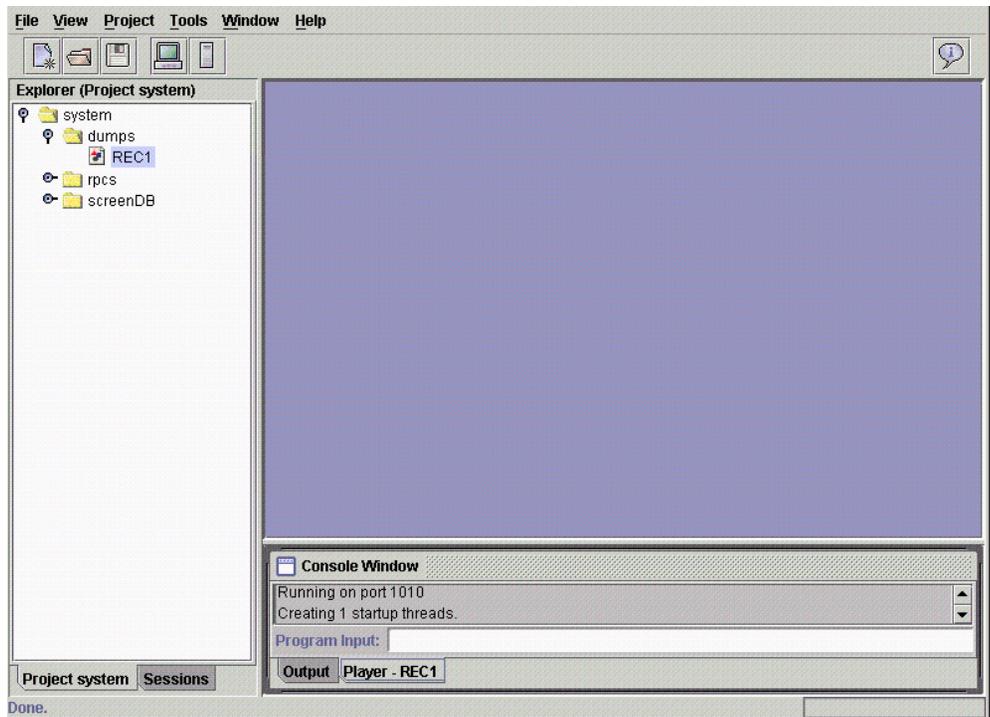
While the Player session is running, you can run Telnet Designer against it to create an RPC application. You can use Telnet Designer as if you were connected to the mainframe.

Procedure: How to Start a Player Session Against a Prerecorded File

To start a player session against a prerecorded file:

1. In the left pane of Telnet Designer, expand the *dumps* node under your project to view all the prerecorded files.
2. Right-click the prerecorded file of interest and select *Start*.

The Player tab becomes available in the lower right pane. The following image shows this tab with the example prerecorded file, REC1.



3. Click the *Player* tab.

The Console Window displays the port number on which the player is running.

Note: Port 1010 is the default port.

Procedure: How to View or Change the Player Server Connection Information

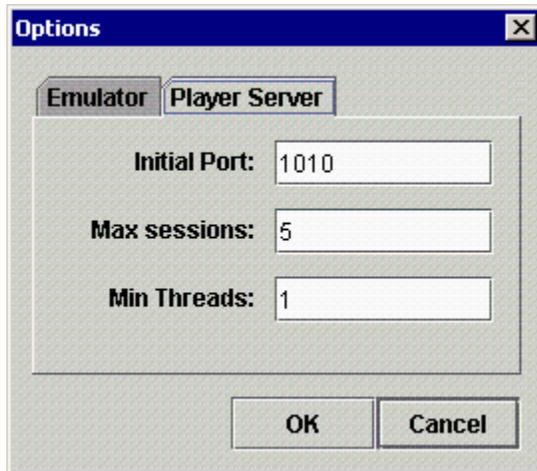
To view or change the Player Server connection information:

1. In Telnet Designer, click *Tools* and select *Options*.

The Options dialog box opens.

2. Click the Player Server tab.

The following image shows the Options dialog box open with the Player Server tab selected.



3. In the Initial Port field, type the port number your Telnet Designer tool will use to connect to the iWay Emulation Adapter (3270/5250).
4. In the Max session field, type a value to indicate the span of port numbers that may be used. For each new Player Server session that is opened against Telnet Designer, the Initial Port number is incremented by 1. As each new session is opened, a new port number is assigned.
5. In the Min Threads field, type the minimum number of processing threads that are allocated to the current player session.
6. Click *OK*.

Emulator Keyboard Mapping

This section describes how your keyboard maps to 3270/5250 keys when you are using the iWay Emulation Adapter (3270/5250).

In this appendix:

- [Emulator Keyboard Mapping](#)

Emulator Keyboard Mapping

The following table lists 3270/5250 keys in the left column and corresponding keyboard equivalents in the right column.

3270/5250 Key	Keyboard
PF1 - PF12	F1 - F12
PF13 - PF24	Shift + F1 - Shift + F12
Clear	Ctrl + C
PA0	Alt + F1
PA1	Alt + F2
PA3	Alt + F3
Page Up	Page Up
Page Down	Page Down
Forward Tab	Tab or Ctrl + F
Backward Tab	Shift Tab or Ctrl + B
Rubout	Backspace
Delete	Delete or Ctrl + E

3270/5250 Key	Keyboard
Home	Home
New Line	Ctrl + N



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iWay

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